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PRIMITIVE AGRICULTURE OF THE INDIANS.

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The opinion seems to have been formed from tales and traditions of early Indian life that the Indians living north of Mexico at the time of the first European settlements in this country were virtually nomads having no fixed abode, and hence giving but little attention to agriculture. On the contrary, the older records, particularly concerning the temperate regions, show that almost without exception the Indians were generally found from the border of the western plains to the Atlantic, dwelling in settled villages and cultivating the soil. De Soto found all the tribes that he visited, from Florida to western Arkansas, cultivating maize and various other food plants. The early voyagers found the same thing true along the Atlantic from Florida to Massachusetts. Captain John Smith and his Jamestown colony, in fact all the early colonies, depended at first largely for subsistence on the products of Indian cultivation. Jaques Cartier, the first European to ascend the St. Lawrence, found the Indians in the present locality of Montreal cultivating the soil and reports them as having "good and large fields of corn." Champlain and other early French explorers testify to the successful tillage of the soil for subsistence by the Iroquois. La Salle and his companions observed the Indians of Illinois and along the Mississippi southward cultivating and largely subsisting on maize.

Sagard, an eyewitness of what he reports, says, in speaking of the agriculture of the Huron in 1623-26, "that they dug a round place at every 2 feet or less where they planted in the month of May in each hole nine or ten grains of corn which they had previously selected, culled, and soaked for several days in water. And every year they thus planted their corn in the same places and spots, which they renovated with their small wooden shovels. He indicates the height of the corn by the statement that he lost his way quicker in these fields than in the prairies or forests." (Histoire du Canada, I, 265-266, 1636.)

Indian corn, the great American cereal, "was found in cultivation from the southern extremity of Chili to the 50th parallel of north latitude" (Brinton, Myths of the New World, 22, 1868). "All the nations who inhabit from the sea as far as the Illinois, and even farther, carefully cultivate the maize corn which they make their principal subsistence." (Du Pratz, History of Louisiana, II, 239, 1763.) "The whole of the tribes situated in the Mississippi Valley, in Ohio, and the lakes reaching on both sides of the Alleghenies, quite to Massachusetts and other parts of New England, cultivated Indian corn. It was the staple product." (Schoolcraft, Indian Tribes, I, 80, 1851.)

Harschberger says that maize was introduced in the United States from the tribes of Mexico and from the Carib of the West Indies. The ease with which it can be cultivated and conserved, and its bountiful yield, caused its

rapid extension among the Indians after it first came into use. With the exception of better tillage the method of cultivation is much the same today among civilized men as among the natives. Thomas Hariot, who visited Virginia in 1586, says the Indians put four grains in a hill "with care that they touch not the others."

The great length of the period previous to the discovery during which maize had been in cultivation is proved by its differentiation into varieties, of which there were four in Virginia; by the fact that charred corn and impressions of corn on burnt clay have been found in the mounds and in the ruins of prehistoric pueblos in the Southwest; by the Delaware tradition; and by the fact that the builders of the oldest mounds must have been tillers of the soil.

Some idea of the extent of the cultivation of maize by some of the tribes may be gained from the following estimates: The amount of corn (probably in the ear) of the Iroquois destroyed by Denonville in 1687 was estimated at 1,000,000 bushels (Charlevoix Histoire Nouvelle France, II, 355, 1744; also Documentary History of New York, I, 238, 1849). According to Tonti, who accompanied the expedition, they were engaged seven days in cutting up the corn of four villages. General Sullivan, in his expedition into the Iroquois country, destroyed 160,000 bushels of corn and cut down the Indian orchards; in one orchard alone 1,500 apple trees were destroyed (History of New York, During the Revolutionary War, II, 334, 1879). General Wayne, writing from Grand Glaize in 1794, says: "The margins of these beautiful rivers -- The Miami of the Lake and the Au-Glaize -- appear like one continuous village for a number of miles, both above and below this place; nor have I ever before beheld such immense fields of corn in any part of America from Canada to Florida" (Manypenny, Indian Wards, 84, 1880).

If we are indebted to the Indians for maize, without which the peopling of America would probably have been delayed for a century, it is also from them that the whites learned the methods of planting, storing, and using it. The ordinary corncribs, set on posts, are copies of those in use among the Indians, which Lawson described in 1701 (History of Carolina, 35, reprint, 1860).

Beans, squashes, pumpkins, sweet potatoes, tobacco, gourds, and the sunflower were also cultivated to some extent, especially in what are now the Southern States. According to Beverly (History of Virginia, 125-128, 1722), the Indians had two varieties of sweet potatoes. Marquette, speaking of the Illinois Indians, says that in addition to maize, "they also sow beans and melons which are excellent, especially those with a red seed. Their squashes are not of the best; they dry them in the sun to eat in the winter and spring" (Voyages and Discoveries, in French Historical Collections, La., IV, 33, 1852).

The foregoing applies chiefly to the region east of the Rocky Mountains, but the native population of the section now embraced in New Mexico and Arizona not only cultivated the soil, but relied on agriculture to a large extent for subsistence. No corn was raised nor agriculture practiced anywhere on the Pacific slope, but frequent mention is made by the chroniclers of Coronado's expedition to New Mexico of the general cultivation of maize by the Indians of that section, and also of the cultivation of cotton. It is stated in the Relacion del Suceso (Winship, in 14th Report, Bureau of American Ethnology, 575, 1896) that those who lived near the Rio Grande raised cotton, but the others

did not. The writer, speaking of the Rio Grande Valley, adds: "There is much corn here."

The sunflower was cultivated to a limited extent both by the Indians of the Atlantic slope and those of the Pueblo region for its seeds, which were eaten after being parched and ground into meal between two stones. The limits of the cultivation of tobacco at the time of the discovery have not yet been well defined. That it was cultivated to some extent on the Atlantic side is known; it was used aboriginally all over California, and indeed a plant called tobacco by the natives was cultivated as far north as Yakutat Bay, Alaska.

The word "tobacco" is of American origin, and has been adopted, with slight variation, into most foreign languages to designate the plant now smoked throughout the world and largely produced in connection with American agriculture. Tobacco was cultivated in most Indian tribes by the men alone, and was usually smoked by them only. The plant had a sacred character to the Indians; it was almost invariably used on solemn occasions, accompanied by suitable invocations to their deities. It was ceremonially used to aid in disease or distress, to ward off dangers, to bring good fortune, generally to assist one in need, and to allay fear.

The planting of medicine tobacco is one of the oldest ceremonies of the Crows, consisting, among other observances, of a solemn march, a foot race among the young men, the planting of seed, the building of a hedge of green branches around the seed bed, a visit to the sweat house, followed by a bath and a solemn smoke, all ending with a feast; when ripe the plant was stored away, and seeds were put in a deerskin pouch and kept for another planting. The tobacco plant was carefully dried by the Indians and kept as free of moisture as possible; that intended for immediate use was kept in bags of deerskin or birch bark, skins of small animals, or baskets neatly woven of roots and grasses. The bags were often elaborately decorated by the women.

Kinnikinnick, an Algonquin word meaning "mixed by hand," designates a mixture of tobacco with some other plant for imparting a more pleasant odor, or to reduce its strength, as the trade tobacco is commonly too strong to suit the Indian's fancy. Among the western tribes tobacco was ordinarily used by mixing it with gum, sumac, and bearberry, the bark, leaves, and roots of two kinds of willow, manzanita leaves, Jamestown weed, arrowwood, and a variety of other woods, barks, leaves, twigs, and even insects.

In much of the southwestern country, such as among the Hopi of Arizona, the Indian is the original dry farmer. He has learned through unnumbered years of coping with arid and semi-arid conditions the fundamentals of getting seeds to grow and produce somewhat more than the quantity planted. The first experiments of the white farmers in this region were sad failures by the side of the native's methods. His corn planted at the usual depth made a fine start ahead of the Indian's, but soon withered and yielded practically nothing, while the corn which the Indian planted in a hole a foot or more in depth, made by a pointed implement, rooted into the necessary moisture by the time it had to contend with conditions above the surface and brought fair results. By studying the Indian's methods, the white farmer has added some improvements, mainly in cultivation, such as maintaining a dust mulch to prevent evaporation, proper thinning, removal of suckers, etc.

The Indians of New Mexico and Arizona had learned the art of irrigating their fields before the appearance of the white man on the continent. This is shown not only by the statements of early explorers, but by the still existing remains of their ditches. "In the valleys of the Salado and Gila, in southern Arizona, however, casual observation is sufficient to demonstrate that the ancient inhabitants engaged in agriculture by artificial irrigation to a vast extent. * * * Judging from the remains of extensive ancient works of irrigation, many of which may still be seen passing through tracts cultivated today as well as across densely wooded stretches considerably beyond the present non-irrigated area, it is safe to say that the principal canals constructed and used by the ancient inhabitants of the Salado Valley controlled the irrigation of at least 25,000 acres" (Hodge in American Anthropologist, July, 1893). Remains of ancient irrigating ditches and canals are also found elsewhere in these territories.

It is found that some of the ancient canals were about 7 feet deep and 4 feet wide at the bottom, but the sides sloped gradually, rising in steps, giving the acequia a width of about 30 feet at the surface. Both the bed and the sides were carefully tamped and plastered with clay to prevent waste through seepage. Remains of what are believed to have been wooden head gates have been exposed by excavation. Where canal depressions have disappeared, owing to cultivation or to sand drift, the canals are still traceable by the innumerable boulders and water-worn concretions that line the banks; these, according to Cushing, having been placed there by the natives as "water-tamers" to direct the streams to the thirsty fields. Several of the old canal beds have been utilized for miles by modern ditch builders; in one instance a saving of \$20,000 to \$25,000 was effected at the Mormon settlement of Mesa, Maricopa County, Arizona, by employing an ancient acequia that traversed a volcanic knoll for 3 miles and which at the point was excavated to a depth of 20 to 25 feet for several hundred feet.

Even where the water supply of a pueblo settlement situated several miles from a stream was obtained by means of canals, each house cluster was provided with a reservoir; and in many instances through the Southwest, reservoirs, sometimes covering an area measuring one mile by one-half mile, designed for the storage of rain water, were the sole means of water supply both for domestic purposes and for irrigation. In the valleys of the Rio Grande and its tributaries, in New Mexico, small reservoirs were the chief means of supplying water to the ancient villages.

Hand irrigation is still practiced to some extent by the Pueblo Indians. Formerly the Zuni women, in order to raise their small crops of onions, chili, etc., were obliged to carry water in jars on their heads, sometimes for several hundred yards. It was then poured on the individual plants with a gourd ladle. At the Middle Mesa villages of the Hopi, garden patches were watered in much the same way, except that here the gardens are within easier reach of the springs and were irrigated by means of a gourd vessel fastened to the end of a long pole. Both the Hopi of today and the ancient inhabitants of the vicinity of the present Solomonsville, on the Gila, constructed reservoirs on the mesa sides from which terraced gardens below were readily irrigated, the reservoirs being supplied by impounding storm water. Throughout the Southwest where pueblos occupied the summits of mesas, reservoirs were provided. For hundreds of years the pueblo of Acema has derived its entire water supply for domestic purposes from a natural depression in the rock which receives the rainfall from the mesa summit.

Although it has been stated that the Indians did not use fertilizers, there is evidence that they did. The Plymouth colonists were told by the Indians to add fish to the old grounds (Bradford, History Plymouth Plantation, Massachusetts Historical Society Collections, 4th series III, 100, 1856). It is also stated that the Iroquois manured their land. Lescarbot says the Armouchiquois, Virginia Indians, and others "enrich their fields with shell and fish." The implements they used in cultivating the ground are described as "wooden hoes" and "spades made of hardwood." "Florida Indians dig their ground with an instrument of wood fashioned like a broad mattock," "use hoes made of shoulder blades of animals fixed on staves," "use the shoulder blade of a deer or a tortoise shell, sharpened upon a stone and fastened to a stick, instead of a hoe;" "a piece of wood, 3 inches broad, bent at one end and fastened to a long handle sufficed them to free the land from weeds and turn it up lightly." Mention is also made of shells used as digging implements, and Moore and Ch. Cushing have found in Florida many large conch that had served this purpose.

Such are some of the earlier statements in regard to the agricultural implements used by the Indians; however, certain stone implements have been found in vast numbers which are generally conceded to have been used in breaking the soil. Of these the most characteristic are the hoes and spades of the middle Mississippi Valley.

Formerly the field work was generally done by the women. Hariot (Hakluyt, Voyages, III, 329, 1810) says, "The women with short pickers or parers (because they use them sitting) of a foot long, and about five inches in breadth, do only break the upper part of the ground to raise up the weeds, grass, and old stubs or cornstalks with their roots." It is a general custom to burn over the ground before planting in order to free it from weeds and rubbish. In the forest regions patches were cleared by girdling the trees, thus causing them to die, and afterwards burning them down.

Though the Indians as a rule have been somewhat slow in adopting the plants and methods introduced by the whites, this has not been wholly because of their dislike of labor, but in some cases has been due largely to their removals by the Government and to the unproductiveness of the soil of many of the reservations assigned them. Where tribes or portions of tribes, as parts of the Cherokee and Iroquois, were allowed to remain in their original territory, they were not slow in bringing into use the introduced plants and farming methods of the whites, the fruit trees, livestock, plows, etc.

